ABSTRACT

The present invention is directed to a nuclear magnetic resonance apparatus and method for generating an axisymmetric magnetic field having long, straight contour lines in the resonance region. A magnetically permeable member is used to shape the static magnetic field generated by an array of permanent magnets. The magnetically permeable member minimizes variations of the static magnetic field in the formation due to vertical motion of the apparatus while obtaining a nuclear magnetic resonance measurement. Further, the magnetically permeable member may minimize variations of the static magnetic field in the formation due to lateral motion of the apparatus while obtaining a nuclear magnetic resonance measurement.